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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,827

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Robert Denk

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EXAMINER

WONG, LINDA

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

06/11/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/821,827	<b>Applicant(s)</b> DENK, ROBERT	
	<b>Examiner</b> LINDA WONG	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 16-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **3DETAILED ACTION**

#### ***Response to Arguments***

1. Applicant's arguments filed 2/11/2008 have been fully considered but they are not persuasive.

- a. Regarding claims 1,5,9,13,15, the applicant contends

"Independent claims 1, 5, 9, 13 and 15 each recite a recursive filter. Neither Bonhomme nor Fudaba teaches a recursive filter. A recursive filter is defined by feeding back output signal values to the signal input of the filter to filter subsequent signal values by using these previously filtered (i.e., fed back) signal values. (See attached Wikipedia excerpt.) Fudaba discloses a feedback path 710 for inputting outputted signals 520 of the digital filter 210 to a processor 130. The processor then re-evaluates the selection of the filter coefficient sets 830. Fudaba fails to teach feeding back outputted signals 520 to the signal input of the digital filter 210. Therefore, Fudaba fails to teach a recursive filter."

The examiner respectfully disagrees. Based on the definition as submitted by the applicant (see Wikipedia submitted with Response to Arguments), a recursive filter uses one or more of the outputs as an input. Fig. 1 shows the adaptive equalizing processor comprising the equalizer (label 230) and the coefficient memory (label 220). In order for the adaptive equalizer processor to perform its functionalities, the output from the equalizer is used to determine the new coefficients. (this is a basic functionality of an adaptive equalizer as shown in Fig. 1 and described in Col 6, line 39 - Col. 7, line 19.) Thus, the output from the adaptive equalizer processor would be the new coefficients or the input to the adaptive equalizer processor.

- 2. Applicant's arguments with respect to claims 4,12 have been considered but are moot in view of the new ground(s) of rejection.
  3. Regarding claims 13-15, the claims have been reconsidered. The rejection is as stated below.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-3,5-6,9-11,13,15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonhomme (US Patent No.: 6954618) in view of Fudaba et al (US Patent No.: 6717464).

a. **Claims 1,5,9,13,15**

i. Bonhomme discloses

- “determining a sequence of unfiltered channel estimation values” (Col. 2, lines 3-7 discloses determining part of the channel estimation based on complex coefficients, Col. 8, lines 41-45 discloses determining first estimation values of the fading coefficients in the sense of maximum likelihood, Col. 6, lines 18-22 discloses the determining “the fading coefficients associated with different paths, that is, it will perform a channel estimation”, wherein first estimation values of the fading coefficients are inputted in the filter as shown in Fig. 3, labels 30 and 35)
- “selecting a specific set of filter coefficients from two or more filter coefficient sets, with the filter coefficients being calculated on the basis

of the MMSE optimality criterion for a digital filter” (Col. 2, lines 53-60  
discloses determining sets of coefficients using MMSE, lines 63-67  
discloses “selection of a set of precalculated Wiener filter coefficients”)

- “filtering of the sequence of unfiltered channel estimation values by means of the recursive digital filter using the selected filter coefficients in order to calculate the filtered channel estimation values” (Fig. 3, label 35 shows a filter, label 34 shows the selected coefficients, label 31 shows the precalculated coefficients, and Col. 6, lines 18-22 discloses determining channel estimation by determining coefficients associated with different paths.)

ii. Bonhomme fails to disclose “a predetermined recursive digital filter”.

iii. Fudaba et al discloses such a limitation. (Fig. 1, label 230 with filter coefficient memory block.) It would have been obvious to one skilled in the art at the time of the invention to use a recursive digital filter as disclosed by Fudaba et al in Bonhomme’s invention to reduce out-of-band power. (Col. 3, lines 27-33)

b. **Claims 2,6,10**, Bonhomme discloses “the specific set of filter coefficients is selected as a function of the relative speed between the transmitter and the receiver and of the signal-to-interference and noise ratio”. (Fig. 3, labels 32,33 and 34 and Col. 8, lines 10-18)

c. **Claims 3,11**,

i. Bonhomme discloses

- “sets of filter coefficients are calculated for different relative speeds between the transmitter and the receiver and for any desired signal-to-interference and noise ratio” (Fig. 3, labels 32,33 and 34, Col. 3, lines 26-29 discloses the power of the signal is signal/noise ratio, Col. 8, lines 10-18 discloses sets of coefficients are determined based on the speed)
- “the selection and filter steps comprises the steps of: selecting a specific set of filter coefficients as a function of the relative speed between the transmitter and the receiver” (Fig. 3, label 32,33,34) “filtering of sequences of unfiltered channel estimation values which are associated with different transmission paths, using the filter coefficients of the same selected specific set.” (Fig. 3, label 35 and 34)

5. **Claims 4,12,14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonhomme in view of Fudaba et al as applied to claim 1 in view of Jayaraman et al (US Patent No.: 20040037354).

a. **Claims 4,12,14,**

- i. Bonhomme in view of Fudaba et al fails to disclose “the filter coefficients of said sets are calculated by averaging over various values of the signal-to-interference and noise ratio in the MMSE optimization process”.
- ii. Jayaraman et al discloses such a limitation. (Fig. 3, Paragraph 23 discloses an equalization configuration is selected based on the MSE or the highest

SINR. Paragraph 44 discloses a set of coefficients are selected based on the MSE calculated on the output. Paragraph 50 discloses calculating and storing the MSE or SINR used for determining the selection of coefficients for an optimum configuration. It is well known in the art that the calculation for the SINR is an average of the power of the signal and average of the interference and noise.) It would have been obvious to one skilled in the art at the time of the invention to incorporate determining the power or SINR as disclosed by Jayaraman et al into Bonhomme in view of Fudaba et al so to optimize the filter parameters.

6. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonhomme in view of Fudaba et al as applied to claim 5 in view of Jayaraman et al (US Patent No.: 6901243).

a. **Claim 7**,

i. Bonhomme discloses

- “two or more sets of filter coefficients, with each set being calculated for a specific relative speed between the transmitter and the receiver and for any given signal-to-interference and noise ratio” (Fig. 3, labels 32,33 and 34, Col. 3, lines 26-29 discloses the power of the signal is signal/noise ratio, Col. 8, lines 10-18 discloses sets of coefficients are determined based on the speed)

- “the means for selection of a specific set of filter coefficients is designed to make the selection as a function of the relative speed between the transmitter and the receiver” (Fig. 3, labels 32,33 and 34, Col. 3, lines 26-29 discloses the power of the signal is signal/noise ratio)
- ii. Bonhomme fails to disclose
- “two or more digital filters are provided for filtering sequences of unfiltered channel estimation values which are each associated with different transmission paths, and the filters are configured using the same filter coefficients from the selected set”.
- iii. Jayaraman et al discloses such a limitation. (Fig. 2, label 240, Col. 4, lines 35-40 discloses the selectable filter can be implemented with a bank of filters and the adaptive filter may be adjusted by adapting the filter coefficients) It would have been obvious to one skilled in the art at the time of the invention to incorporate a bank of filters receiving the same filter coefficients as disclosed by Jayaraman et al into Bonhomme in view of Fudaba et al’s invention so to detect and mitigate channel interference. (Col. 2, lines 15-20)
7. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonhomme in view of Fudaba et al further in view of Jayaraman et al as applied to claim 7, further in view of Jayaraman et al (US Publication No.: 20040037354).
- a. **Claim 8,**



- i. Bonhomme in view of Fudaba et al fails to disclose “the filter coefficients of said sets are calculated by averaging over various values of the signal-to-interference and noise ratio in the MMSE optimization process”.
- ii. Jayaraman et al discloses such a limitation. (Fig. 3, Paragraph 23 discloses an equalization configuration is selected based on the MSE or the highest SINR. Paragraph 44 discloses a set of coefficients are selected based on the MSE calculated on the output. Paragraph 50 discloses calculating and storing the MSE or SINR used for determining the selection of coefficients for an optimum configuration. It is well known in the art that the calculation for the SINR is an average of the power of the signal and average of the interference and noise.) It would have been obvious to one skilled in the art at the time of the invention to incorporate determining the power or SINR as disclosed by Jayaraman et al into Bonhomme in view of Fudaba et al so to optimize the filter parameters.

***Allowable Subject Matter***

8. **Claims 16-20** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
- a. Yang et al (US Patent No.: 6954509)
  - b. Smee et al (US Patent No.: 6983125)
  - c. Onggosanusi et al (US Patent No.: 7181167).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linda Wong whose telephone number is 571-272-6044. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Linda Wong 6/2/2008

/Mohammad H Ghayour/  
Supervisory Patent Examiner, Art Unit 2611